drawing a straight line between two dots 100 mm. apart, "the facing position is more favorable for horizontal and vertical lines than it is for inclined lines. The right side position is also more favorable for horizontal and vertical lines than for lines at 45°. Holding the pencil far from the point is in general the most accurate method; near the point is as accurate as the middle grip."

To understand the apparatus described in the other articles, the reader is referred to the original, where they are illustrated and adequately described.

F. B. D.

L'audition Colorée et les Phénomenès Similaires. Communications de MM. FRANCIS GALTON et EDOUARD GRÜBER.

The results of the investigations set forth in this paper were read at the Congress of Experimental Psycholgy at London, 1892. After giving a table of the "chromatisms and photisms of the senses," the results of investigations concerning colored auditions is taken more at length, and especially that of the speaking voice. The subject experimented on heard *a* as pure white; *e*, yellow; *i*, blue; o, very black; *u (ou)* black; *ă*, brown, and *î*, gray, approaching black. The same thing occurred for the consonants, except at the moment of hearing, the subject perceived two colors; one, the color of the consonant, and the other, a slight ray corresponding to the vowel used in speaking the name of the consonant. For example *f* (*ef*), is accompanied with the perception of a reddish-brown and a slight orange tint on the front side. This orange tint, the author thinks is due to the influence on the usual color (yellow) of *e*, of the reddish-brown of the letter *f*. This leads to the attempt to separate the vowel sounds from the consonants. The facts stated in this paper are very interesting, but perhaps not as important as the author thinks when he says: "These facts are of very great importance; they touch almost all the great problems of contemporaneous psychology. Moreover, they show a new path for crossing the field of the spiritually unknown, and give us a superior means of analysis."

F. B. D.

Die bewusste Beziehung zwischen Vorstellungen als konstitutives Bewusstseinselement. Ein Beitrag zur Psychologie der Denkerscheinungen. Von DR. E. SCHRADER. Leipzig, Verlag von Duncker und Humblot, 1893, pp. xii., 84.

This pamphlet is the first of a proposed series of works upon judgment; more accurately, upon the place of the consideration of judgment in psychology and logic. I propose to devote some space to its criticism, since the author is making a serious attempt to answer a real and difficult question.

I may say at once that I do not regard the word "judgment" as a psychological, but only as a logical term. The psychological correlate of a judgment is an association or an apperceptive combination. I should, therefore, demur to the phrase "psychology of judgment" upon methodological grounds. The writer renounces it in favor of "psychology of conscious relation," for the reason that this is the more comprehensive expression—including judgments which are and judgments which are not formulated in language. But the confusion remains: a "relation" in psychology is just an association; relating is the logical way of marking associability (cf. preface, p. vi.).—A second point touched on in the preface is the relation of the association-psychology to psychology in general. While Dr. Schrader rightly refuses with decision to equate the two, he still

appears to lay too great a stress on the association-doctrine. The laws of association are coming to be more and more regarded in the way in which Aristotle regarded them,—as practical hints towards method, not as universal psychological uniformities. The notion of "association" itself has been divided up into those of "fusion" and "combination" or association proper; and we know far more of the former—new as the concept is—than we do of the latter. How much content is there in the association-doctrine of modern psychology? And how much exactness (p. viii.) attaches to the majority of extant association-experiments?

The introduction contains two sections. The first defines or describes "apperception," a term which the author uses in Erdmann's, *i. e.*, practically, in Herbart's sense. A special critique of Wundt's view is promised. The second deals with the limits of the individual perception-idea. Its unity is a functional unity. The discussion shows (p. 4) a want of acquaintance with Külpe's work (*Zur Lehre vom Willen, etc.*). Chapter I. gives instances of judgment-like processes (Sigwart), and analyzes them into (1) ideas of perception and movement, and (2) reproduced ideas. The general problem of the idea itself (its apperceptive constituents, in Wundt's terminology), and the special one of the movement-idea, are not touched upon. Chapter II. opens with an attempt at the associative explanation of these processes. It is found unsuccessful. But the attempt can hardly be more satisfactory to the associationists than the foregoing analysis would be to the (Wundtian) apperceptionist. Not only has the author tied himself down to his own analysis, and so missed certain associative moments which an opponent would at once urge; he also speaks throughout in terms of the particular association, neglecting entirely the important process of general reproduction. He himself proposes three further experiments. [(1) Can the instances be explained on the assumption that their analysis was incomplete? This is negatived. (2) On the assumption that several of the previous ideas exercise in common a reproductive effect? Yes; if we accept Wundt's active apperception. Only partially, if we do not. (3) On the assumption of very highly complex ideas? (Constellation-unit.) Only partially.] Similar remarks apply to these: the associationist could find a ready answer to the objections raised. The proof of a constituent of consciousness other than the sensation (as basis of the associating idea) must, it is true, be looked for in the first place analytically. But why start with so complex a process as that of (technical) association? Rather is it advisable to analyze idea, impulse, attention. Then, if the non-sensational element be found, we can proceed synthetically to put it into the more complicated concrete processes in which it can belong, not caring for any charge of multiplication of entities. For this is the essence of the matter: the associationist says, "I find in this complex process only associated ideas;" his opponent says, "I find in it something more." It is introspection against introspection. What remains but a shifting of the ground to simpler processes? The result of their investigation may be a similar divergence, but, at any rate, the issue becomes so far clearer.

Chapter III. deals with conscious relation as a constitutive element of consciousness; the modification of the signification of "consciousness," which its introduction entails, and its character as positive or negative. It is a little hard that neither Herbert Spencer's doctrine[1] of the composition of mind, nor James' view

[1] On p. 64 Spencer is mentioned, but the author's statement is dogmatic, and no references are given. There can, I think, be little doubt that Spencer's "relation" vacillates between *Beziehung* and *Verbindung*, and that it is not exclusively the equivalent of the latter term.

of the psychology of relation, finds mention. As for the exposition itself, I can only refer the reader to it. I hold in opposition to Dr. Schrader that the "relation" is logical, not psychological, but that it *can* be ideated (pp. 37 ff.), as every concept can. It is impossible here to justify this view at the necessary length.

In Chapter IV. is treated the relation between conscious relation and association. Association assists and prepares the way for relation; it is determined by the relation, and the latter is, in cases, resolved by it. In other words, the conscious relation stands to association very much as Wundt's apperceptive combination stands to it. Chapter V. discusses the views of some other psychologists: (1) Of the Herbartians and Münsterberg (doctrine of inhibition of ideas); (2) of von Hartsen; (3) of Stumpf (doctrine of relativity). Chapter VI. asks whether the conscious relation can serve to explain judgment. This question will be fully answered in the author's forthcoming *Analyse des Urtheils*.

If we take exception to Chapter III., it is unnecessary to criticise the superstructure raised upon it. While (as already said) I am in almost complete disagreement with Dr. Schrader on many points, I believe that his work is an honest effort to clarify our notions of the relation in which logic and psychology stand to one another. His further publications cannot but be interesting. E. B. T.

Warum müssen wir schlafen? Eine neue Theorie des Schlafes. DR. MED. EMANUEL ROSENBAUM. 1892, 58 pages.

The new theory is to be classed with those which attribute fatigue and sleep chiefly to the toxic products formed during activity. The author endeavors to show that the phenomena of sleep can be accounted for by the formation in the nervous system, and deficient elimination, of water, which is to be looked upon as a noxious waste product.

The theory is introduced by a synopsis of some of the facts of nervous and muscular activity and a sketch of the various theories of sleep from the time of Alkmæon, 585 B. C., to the present. The reference to current theories is, however, very meager, and only that of Preyer is mentioned.

The new theory finds its support in a study of the anatomical conditions of the nervous system in diseases like scarlet fever, abdominal typhus, acute atrophy of the liver, meningitis tuberculosa, etc., which are characterized by a tendency to sleep.

The symptoms and anatomical details are taken from Ziemesson's hand-book. In all cases there is a dropsical condition of the nervous system to which the author attributes the mental disturbances, especially the abnormal tendency to sleep.

Another line of evidence is found in the statements of Schiff, Harless and Ranke, that the excitability of a nerve diminishes with the increase of water in it.

As to the source of the water, some may exude from the veins and arteries, but it comes chiefly from the chemical changes in the tissues. The water eliminated by the kidneys and sweat glands comes from the arterial, that of the lungs from the venous blood. The amount of aqueous vapor exhaled is not affected by the amount taken into the stomach, but by the amount of work done. The venous blood carries away the water formed by oxydation in the tissue metabolism. The principle of hydrodiffusion applies to its elimination. The percentage of water in the venous blood is less than in the tissues, hence they will be drained by it. The water removed by respiration is the only part of interest for the theory.